

NOTICE OF REVISION (NOR) (See MIL-STD-480 for instructions) This revision described below has been authorized for the document listed.		DATE (YYMMDD) 93-07-13	Form Approved OMB No. 0704-0188
Public reporting burden for this collection is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.			
1. ORIGINATOR NAME AND ADDRESS <div style="text-align: right; margin-right: 100px;">Defense Electronics Supply Center</div> Dayton, Ohio 45444-5277		2. CAGE CODE 67268	3. NOR NO. 5962-R062-93
		4. CAGE CODE 67268	5. DOCUMENT NO. 82036
6. TITLE OF DOCUMENT MICROCIRCUITS, LINEAR, LOW OFFSET OPERATIONAL AMPLIFIERS, MONOLITHIC SILICON		7. REVISION LETTER (Current) C (New) D	
		8. ECP NO. 82036ECP-1	
9. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES			
10. DESCRIPTION OF REVISION Sheet 1: Revisions ltr column; add "D" Revisions description column; add "Changes in accordance with NOR 5962-R062-93". Revisions date column; add "93-07-13". Revision level block; add "D". Rev status of sheets; For sheets 1, 4, 5, 10, and 11, add "D". Sheet 4: TABLE I. Input bias current test, +I _{IB} , group A subgroups 2 and 3, device type 01, delete -3 nA min and 3 nA max and substitute -4 nA min and 4 nA max. Revision level block; add "D". Sheet 5: TABLE I. Output short circuit current test. I _{OS(+)} , group A subgroups 1 and 2, device types 01 and 02, delete -60 mA min and substitute -65 mA min. Group A subgroup 3, device types 01 and 02, delete -60 mA min and substitute -70 mA min. I _{OS(-)} , group A subgroups 1 and 2, device types 01 and 02, delete 50 mA max and substitute 65 mA max. Group A subgroup 3, device types 01 and 02, delete 50 mA max and substitute 70 mA max. Revision level block; add "D". Sheet 10: 6.4. Approved source of supply. Under military drawing part number 8203602GX, add vendor CAGE number 27014 for vendor similar part number OP07H/883. Under military drawing part number 82036012X, delete vendor CAGE number 54186 and vendor similar part number MPOP07AL/883. Revision level block; add "D". CONTINUED ON NEXT SHEET			
11. THIS SECTION FOR GOVERNMENT USE ONLY			
a. CHECK ONE <input checked="" type="checkbox"/> EXISTING DOCUMENT SUPPLEMENTED BY THIS NOR MAY BE USED IN MANUFACTURE. <input type="checkbox"/> REVISED DOCUMENT MUST BE RECEIVED BEFORE MANUFACTURER MAY INCORPORATE THIS CHANGE. <input type="checkbox"/> CUSTODIAN OF MASTER DOCUMENT SHALL MAKE ABOVE REVISION AND FURNISH REVISED DOCUMENT TO:			
b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT DESC-ECS	SIGNATURE AND TITLE <div style="text-align: center;">MICHAEL A. FRYE BRANCH CHIEF</div>	DATE (YYMMDD) 93-07-13	
12. ACTIVITY ACCOMPLISHING REVISION DESC-ECS	REVISION COMPLETED (Signature) RICK C. OFFICER	DATE (YYMMDD) 93-07-13	

10. DESCRIPTION OF REVISION - CONTINUED

Document No.: 82036
Revision: D
NOR No.: 5962-R062-93
Sheet: 2 of 2

Sheet 11: 6.4. Approved source of supply - Continued. Adding vendor.

Vendor CAGE
number

Vendor name
and address

27014

National Semiconductor Corporation
2900 Semiconductor Drive
P.O. Box 58020
Santa Clara, CA 95052-8090

Revision level block; add "D".

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
B	Change to military drawing format. Add case outline 2. Inactivate G and P case outlines for device types 01 and 02 for new design. Delete vendor CAGE 34371. Editorial changes throughout.	1987 JULY 24	M. A. FRYE
C	Add three vendors, CAGE 07933, CAGE 64155, and CAGE 54186. Make changes to paragraphs 1.2.2, 4.2, and 4.3. Make changes to table I, table II, and figure 1. Editorial changes throughout.	1989 JAN 24	M. A. FRYE

[illegible]

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part number. The complete part number shall be as shown in the following example:

82036	01	G	X
_____	_____	_____	_____
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish per MIL-M-38510

1.2.1 Device types. The device types shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	OP-07A	Operational amplifier, ultra low offset
02	OP-07	Operational amplifier, low offset

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
G	A-1 (8-lead, .370" x .185"), can
P	D-4 (8-lead, .405" x .310" x .200"), dual-in-line package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage (V_{CC})	± 22 V dc
Input voltage range (V_{IN})	$\pm V_{CC}$
Differential input voltage range	± 30 Vdc
Output short circuit duration- 1/	
Lead temperature (soldering, 60 seconds)	$+300^{\circ}\text{C}$
Storage temperature-	-65°C to $+150^{\circ}\text{C}$
Thermal resistance, junction-to-case (θ_{JC})	MIL-M-38510, appendix C
Maximum power dissipation (P_D): 2/	
Case G	330 mW at $T_A = +125^{\circ}\text{C}$
Cases P and 2	400 mW at $T_A = +125^{\circ}\text{C}$
Thermal resistance, junction-to-ambient (θ_{JA}):	
Cases P and 2	120°C/W
Case G	150°C/W

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	± 5.0 V dc to ± 20.0 V dc
Ambient operating temperature range (T_A)	55°C to $+125^{\circ}\text{C}$

1/ Output may be shorted to ground indefinitely at $V_S = \pm 15$ V, $T_A = +25^{\circ}\text{C}$. Temperature and supply voltages must be limited to ensure dissipation rating is not exceeded.

2/ Must withstand the added P_D due to short circuit test, e.g., I_{OS}

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2. APPLICABLE DOCUMENTS

2.1 Government specification and standard. Unless otherwise specified, the following specification and standard, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of the specification and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections and logic diagrams. The terminal connections and logic diagrams shall be as specified on figure 1.

3.2.2 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table I and apply over the full ambient operating temperature range.

3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55° C ≤ T _A ≤ +125° C V _{CC} = ±15 V, unnull'd, V _{CM} = 0 (unless otherwise specified)	Group A subgroups	Limits				Unit
				01		02		
				Min	Max	Min	Max	
Input offset voltage	V _{IO}	1/ 2/	1	-25	25	-75	75	μV
		2/	2, 3	-60	60	-200	200	μV
Input offset voltage temperature sensitivity	dV _{IO} dT	3/	2, 3	-6	.6	-1.3	1.3	μV/°C
Input bias current	+I _B		1	-2	2	-3	3	nA
			2, 3	-3	3	-6	6	nA
	-I _B		1	-2	2	-3	3	nA
			2, 3	-4	4	-6	6	nA
Input offset current	+I _{IO}		1	-2	2	-2.8	2.8	nA
			2, 3	-4	4	-5.6	5.6	nA
Power supply rejection ratio	+PSRR	V _{CC} ⁺ = 20 V to 5 V, V _{CC} ⁻ = -15 V	1		10		10	μV/V
	-PSRR	V _{CC} ⁺ = 15 V, V _{CC} ⁻ = -20 V to -5 V	1		10		10	μV/V
	+PSRR	V _{CC} ⁺ = 20 V to 5 V, V _{CC} ⁻ = -15 V	2, 3		20		20	μV/V
	-PSRR	V _{CC} ⁺ = 15 V, V _{CC} ⁻ = -20 V to -5 V	2, 3		20		20	μV/V

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55° C ≤ T _A ≤ +125° C V _{CC} = ±15 V, unnullled, V _{CM} = 0 (unless otherwise specified)	Group A subgroups	Limits				Unit
				01		02		
				Min	Max	Min	Max	
Common mode rejection ratio	CMRR	V _{CM} = ±10 V	1	110		110		dB
		V _{CM} = ±13 V	2, 3	106		106		dB
Output short circuit current	I _{OS(+)}	t ≤ 25 ms <u>4/</u>	1, 2, 3	-60		-60		mA
	I _{OS(-)}		1, 2, 3		50		50	mA
Supply current	I _{CC}		1		4		4	mA
			2, 3		5		5	mA
Output voltage swing (minimum)	V _{OP}	R _L = 1 kΩ	4, 5, 6	-10	10	-10	10	V
		R _L = 2000Ω	4, 5, 6	-12	12	-12	12	V
Open loop voltage gain (single ended)	A _{VS}	T _A = +25° C <u>5/</u>	4	300		200		V/mV
		<u>5/</u>	5, 6	200		150		V/mV

1/ Users are cautioned to use the group C end-point limits for design purposes due to drift experienced with this parameter during steady-life test (see table III).

2/ Testing will occur at least 250 ms after application of power.

3/ Shall be guaranteed if not tested, to the specified parameters.

4/ Continuous short circuit limits are considerably less than the indicated test limits since maximum power dissipation cannot be exceeded.

5/ $V_{OUT} = 0\text{ V}$ to $+10\text{ V}$ for $A_{VS}(+)$ and $V_{OUT} = 0$ to -10 for $A_{VS}(-)$. $R_L = 2000\Omega$.

3.5 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.6 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

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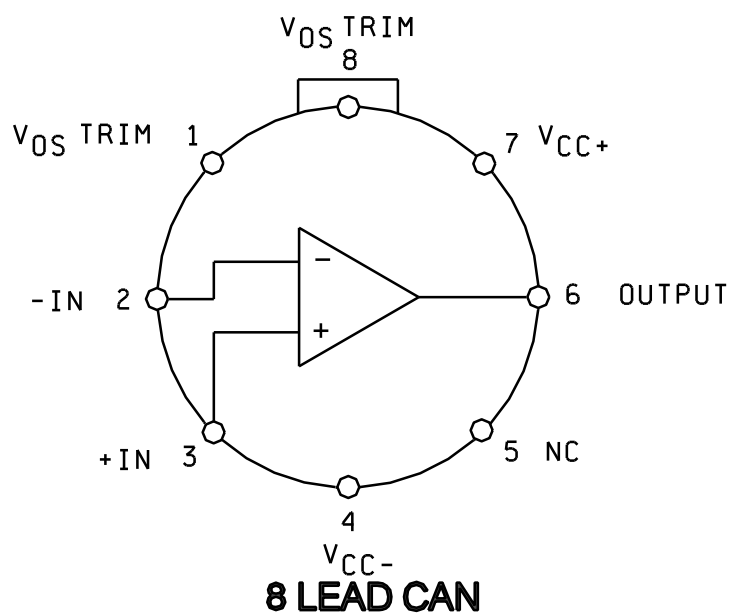
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DEVICE TYPES 01 AND 02

CASE G



DEVICE TYPES 01 AND 02

CASE P

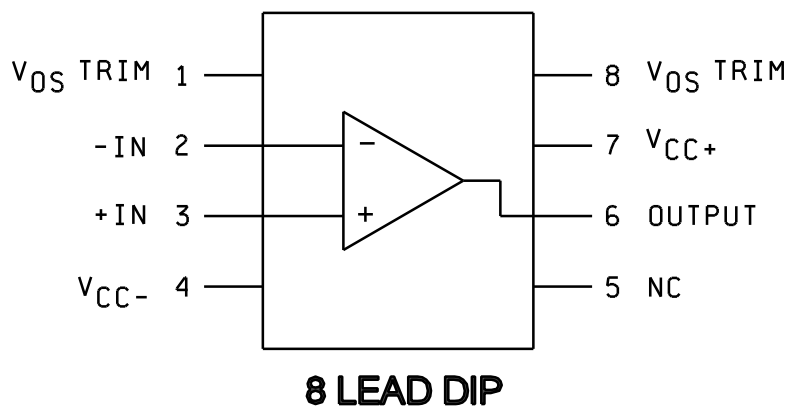


FIGURE 1. Terminal connections and logic diagrams.

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CASE 2

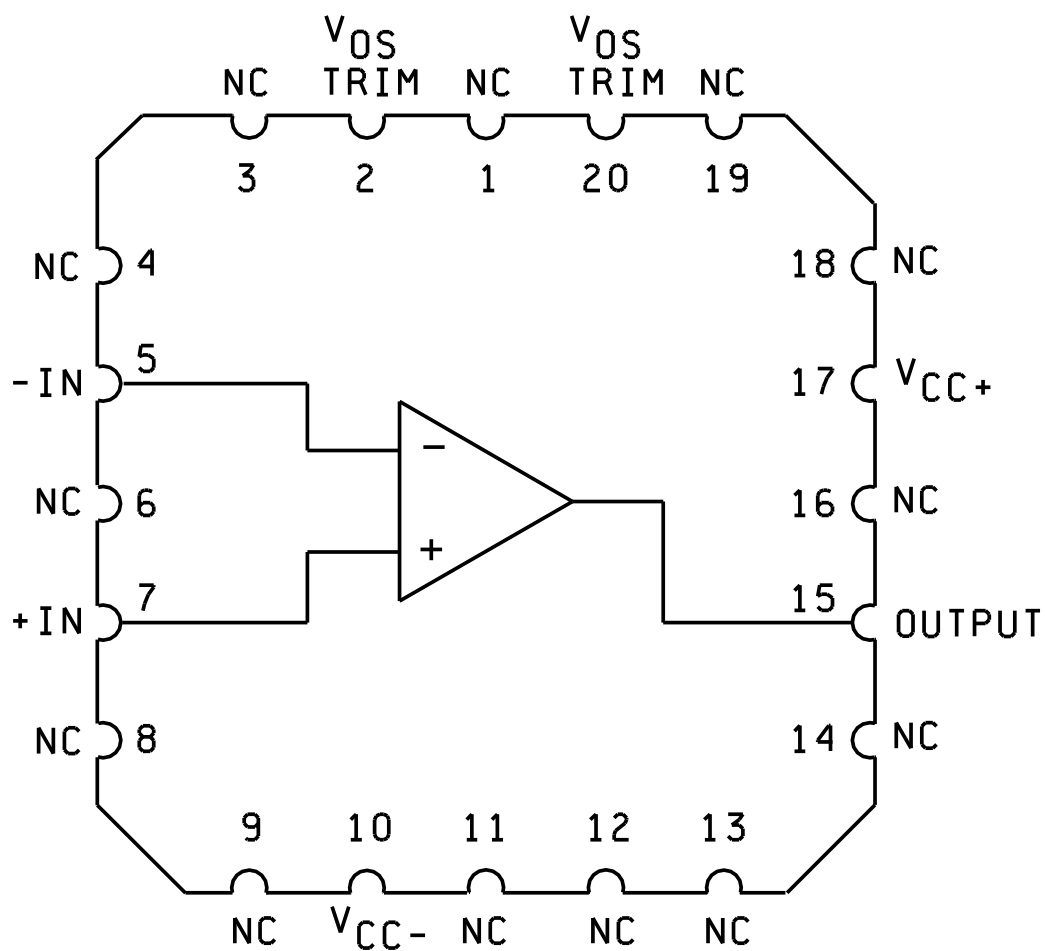


FIGURE 1. Terminal connections and logic diagrams - Continued.

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3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.8 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) $T_A = +125^{\circ}\text{C}$, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 7, 8, 9, 10, and 11 in table I, method 5005 of MIL-STD-883 shall be omitted.

4.3.2 Groups C and D inspections.

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test conditions, method 1005 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) $T_A = +125^{\circ}\text{C}$, minimum.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

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TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	1
Final electrical test parameters (method 5004)	1*, 2, 3, 4
Group A test requirements (method 5005)	1, 2, 3, 4, 5, 6
Groups C and D end-point electrical parameters (method 5005)	1** and table III

* PDA applies to subgroup 1 excluding V_{IO}

** Table III limits used for V_{IO} and $\pm I_B$ in place of table I limits.

TABLE III. Group C end-point electrical parameters.

T _A = +25° C, ±V _{CC} = ±15 V, V _{CM} = 0 V									
Test	Device 01				Device 02				Unit
	End-point limit		Delta		End point limit		Delta		
	Min	Max	Min	Max	Min	Max	Min	Max	
V _{IO}	-100	+100	-75	75	-175	+175	-100	100	μV
±I _B	-3	+3	-1	1	-4.5	+4.5	1.5	1.5	nA

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

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6.2 Replaceability. Replaceability is determined as follows:

- a. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.
- b. When a QPL source is established, the part numbered device specified in this drawing will be replaced by the microcircuit identified as part number M38510/13501BXX and M38510/13502BXX.

6.3 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

6.4 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.5) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number <u>1/</u>	Replacement military specification part number
8203601GX <u>2/</u>	06665 07933 64155 54186	0P07AJ 0P-07AT/883B 0P-07AH/883 MPOPO7AJ/883	M38510/13501BGX
8203601PX <u>2/</u>	06665 07933 64155 54186	0P07AZ 0P-07ADE/883B 0P-07AJ8/883 MPOPO7AZ/883	M38510/13501BPX
82036012X	06665 54186	0P07ARC MPOPO7AL/883	M38510/13501B2X
8203602GX <u>2/</u>	06665 07933 64155 54186	0P07J 0P-07T/883B 0P-07H/883 MPOPO7J/883	M38510/13502BGX
8203602PX <u>2/</u>	06665 07933 64155 54186	0P07Z 0P-07DE/883B 0P-07J8/883 MPOPO7Z/883	M38510/13502BPX
82036022X	06665 54186	0P07RC MPOPO7L/883	M38510/13502B2X

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

2/ Inactive for new design, use QPL M38510 product.

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and address

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Precision Monolithic Incorporated
1500 Space Park Drive
Santa Clara, CA 95050

07933

Raytheon Company
Semiconductor Division
350 Ellis Street
P.O Box 7016
Mountain View, CA 94036-7016

64155

Linear Technology Corporation
1630 McCarthy Boulevard
Milpitas, CA 95035-7487

54186

Micro Power Systems
3100 Alfred Street
Santa Clara, CA 95054

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